Mycoplasma hyopneumoniae elimination: Swine Vet Center experience

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Introduction

Mycoplasma hyopneumoniae (*M. hyopneumoniae*) continues to be one of the most prevalent and economically significant respiratory pathogens in the swine industry.[1] *M. hyopneumoniae* is the etiologic agent of enzootic pneumonia, a chronic respiratory disease in swine characterized by a chronic, non-productive cough.[2,3] Economic losses related to *M. hyopneumoniae* are associated with decreased feed efficiency, reduced average daily gain, and increased medication costs.[1] (Table 1) Details the differences in performance average daily gain, feed efficiency, percent mortality, percent marketed, feed grade medication and other medication costs in Mycoplasma negative pigs vs positive pigs (all pigs are similar genetics and nutrition).

The economics of this disease had been the primary driver for producers to look at elimination. Many herds have been able to stay negative for an extended period of time. This has also encouraged more herds to move forward with elimination when looking at the return on investments and the amount of time that herds have been able to stay negative. (Table 2) Outlines the success of elimination programs and the amount of time that they have been able to stay negative.

M. hyopneumoniae elimination protocols

If elimination of *M. hyopneumoniae* from a herd or flow is desired, *M. hyopneumoniae* elimination protocols can be implemented. The following protocols for *M. hyopneumoniae* elimination have been described: 1.) Depopulation and repopulation, 2.) Herd closure and medication, 3.) Whole herd medication without herd closure and 4.) Change of flow in a parity segregated flow.

Table 1: Performance differences between *M. hyopneumoniae* positive and negative groups.

2013 performance

	Mycoplasma (-)	Mycoplasma (+)	Difference
Average daily gain	1.87	1.76	0.11
FE	2.65	2.73	-0.08
Mortality	2.24%	3.63%	-1.39%
Culls	1.46%	2.37%	-0.91%
% marketed	96.30%	94%	2.30%
Feed grade medication	$1.64	$1.99	$(0.35)
Other medication	$0.37	$0.63	$(0.26)

Table 2: Success of *Mycoplasma hyopneumoniae* eliminations.

	Herd closure	Medication	Total
Number of sows	93250	22950	116300
Number of herds	33	13	46
Percent of negative at 1 year	97%	67%	89%
Percent of negative to date	81%	58%	75%
Herds negative	26	7	33
Average months negative	49	37	46

Depopulation and repopulation is the most direct approach for *M. hyopneumoniae* elimination, as it involves removal of the entire breeding herd and restocking with *M. hyopneumoniae* negative replacements.[4] Advantages of depopulation and repopulation include the ability to eliminate more than one disease at once and the opportunity to improve genetics;[4] however, there is a complete loss of production from the time the breeding herd is liquidated until replacement females begin farrowing. The duration of lost production can be reduced with an offsite breeding project, but is associated with additional costs. Furthermore, total depopulation of the breeding herd may be undesirable on farms with animals that have a high genetic potential (i.e., genetic nucleus or multiplier farms).

Herd closure and medication approach has been adapted from the Swiss model for *M. hyopneumoniae* and from herd closures done for PRRS control and many times in combination with PRRS elimination from the herd as well. The basis of this procedure is to close the herd once all replacement animals have been exposed to *M. hyopneumoniae* and not make any additions for 240 days. Work done by Pijoan and Peters demonstrated that this was the time that it took for animals to no longer be shedding following natural infection.[5] Using this information gilts are accumulated for the closure into the herd when possible or with an offsite breeding project. For gilts that will be added to the herd in this time they must be infected with *M. hyopneumoniae* to start the clock ticking. This can take 1-2 months and is a critical step in the process to ensure success. Once this is completed then herd immunity is boostered every 90 days with whole herd vaccination. At 7 weeks before the negative replacements are scheduled to arrive the whole herd is medicated (sows and piglets). Although different combinations have been done the most common method had been to use Lincomycin in the water for the sows and injection of Draxxin to the piglets at birth and at 14 days to piglets. (Figure 3) A detailed time line of herd activates including the offsite breeding project. (Figure 4) Details a check list that can be used to make sure that all activities are being completed in the process and following the timeline.

Whole herd medication is another method that allows for much faster elimination from the herd but has a lower rate of success. This procedure does not involve a specific herd closure but is generally done when gilts have just entered the farm. Treating all animals on site and then coming back 2 weeks later to treat all sows again. Waiting until all treated piglets are weaned off site and then bringing negative replacements back into the herd.

Figure 3: Time of events in a herd closure for *Mycoplasma hyopneumoniae* including an offsite breeding project.

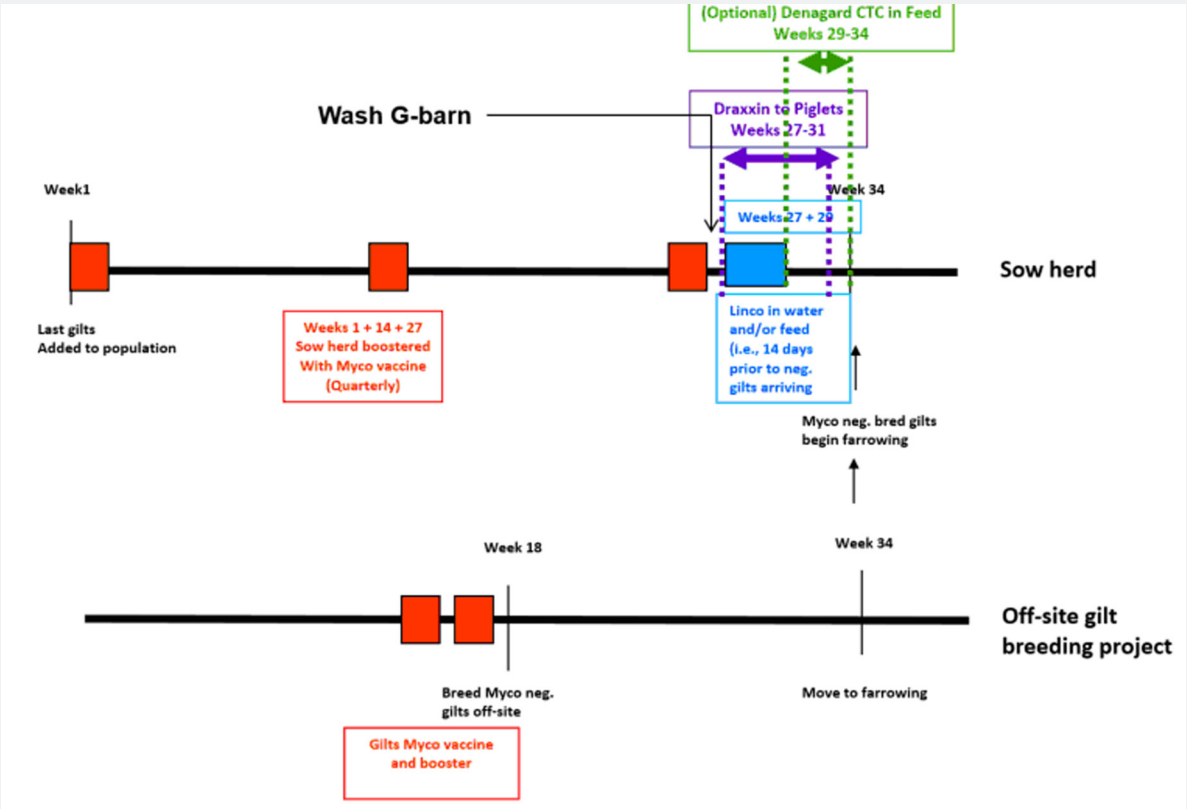

Figure 4: Checklist of activities for *Mycoplasma hyopneumoniae*.

Mycoplasma Eradication Herd Closure Protocol

Farm

Date 8/15/2011

Date	Activity	Product	Dosage	Withdrawal	Completion Date	INT	z Dose
8/15/2011	Herd Closure	N/A	N/A	N/A			
8/17/2011	Vaccinate all gilts in GDU	M+PAC	1 cc	21 days			1900
9/1/2012	Whole herd vaccination(sow unit animals	M+PAC	1 cc	21 days			5200
9/5/2011	Test Gilts for Mycoplasma Exposure	N/A	N/A	N/A			
9/7/2011	Vaccinate all gilts in GDU	M+PAC	1 cc	21 days			1900
9/14/2011	Myco Exposure Complete	N/A	N/A	N/A			
11/30/2012	Whole herd vaccination(sow unit & GDU)	M+PAC	1 cc	21 days			6400
2/19/2012	and keep track of pens so that they can be retested	N/A	N/A	N/A			
3/7/2012	Whole herd vaccination(sow unit & GDU)	M+PAC	1 cc	21 days			5700
3/7/2012	and keep track of pens so that they can be retested	N/A	N/A	N/A			
4/8/2012	Wash the gestation	N/A	N/A	N/A			
4/22/2012	Whole sow herd medication Lincomycin in the water	Lincomycin	(64 gms Lincomycin) 2 gallons stock solution	None			
4/22/2012	(larger pigs will need to adjust dose by weight)	Draxxin	Diluted to 1cc 4.4.lbs	33 days			
4/22/2012	Plain 200 mg iron injection	Iron 200	1.5 cc	None			
5/6/2012	Stop whole herd medication Lincomycin in the water Begin Dengard CTC in Feed Lactation and Gestation	Dengard CTC	CTC 10mg per lbs Dengard 35 gms/ ton	14 days			
5/6/2012	Begin Piglet treatment at 14 days of age	Draxxin	Diluted to 1cc 4.4.lbs	33 days			
5/20/2012	Last piglets treated at birth	N/A	N/A	N/A			
6/3/2012	Negative Gilts enter breeding herd	N/A	N/A	N/A			
6/3/2012	Last Piglet treatment at 14 days of age	N/A	N/A	N/A			
6/10/2012	Wean Last treated Pig with Draxxin	N/A	N/A	N/A			
6/11/2012	Date pigs are expected negative	N/A	N/A	N/A			

271 Days since the herd was confrimed (+)

301 Days since closure

Longer closure only will drive the project to better success (let me know if you want to do this and we can redo the check list)

Best results for water medication is a high volume water medicator (40 gallons per minute) for each the farrowing and gestation.

Parity segregated flow offers a unique opportunity to eliminate *M hyopneumoniae* in taking advantage of the flow to allow for immune sows. Since the older parity sows should not be shedding and not have exposure to younger sows that are shedding, these sows should be negative and allow for flowing the negative replacement animals into these herds, and then flow the system backwards (following older immune sows to parity 1 site) until 240 days have passed on the last positive gilts introduced into the parity 1 herd. Once this is completed the flow can go back to normal. Some herds using this approach have used medication along with the change of flow to drive the odds to higher success.

Table 2 details the success of these methods and the period of time that these herds have been able to stay negative on average. The longest herd in this data base has stayed negative for 11 years following elimination. These procedures have been done in farrow to wean farms of various sizes with the largest herd being 8000 sows. A spreadsheet has been developed to document the cost of *M hyopneumoniae* in a herd as well as the various procedures to eliminate it and how to calculate return on investment.[6,7] This tool has been very useful in detailing multiple scenarios for owners as they look at the possibilities.

Discussion

There are many different ways to eliminate *M hyopneumoniae* from herds; every herd will be different with the goals for the elimination plan and the risk levels that the owner is willing to take. Hopefully with this presentation one can see some of the values for elimination and different methods to do it. The successes of herds that have followed these procedures is outlined below. Every herd owner will need to decide if there is enough return for doing one of these projects but hopefully with this information they along with the herd veterinarians can make a more informed decision on how to move forward for their specific herd.

References

1. Maes D, Segales J, Meyns T, Sibila M, Pieters M, Haesebrouck F. Control of *Mycoplasma hyopneumoniae* infections in pigs. Rev. *Vet Microbiol.* 2008;126(4):297–309.

2. Mare C, Switzer W. New species: *Mycoplasma hyopneumoniae*. A causative agent of virus pig pneumonia. *Vet Med*. 1965;60:841–846

3. Goodwin RFW, Pomeroy AP, Whittlestone P. Production of enzootic pneumonia in pigs with a mycoplasma. *Vet Rec*. 1965;77:1247–1249.

4. Yeske P. Mycoplasma eradication strategies. *Proc AASV.* Orlando, Florida. 2007;367–370.

5. Pieters M, Pijoan C, Fano E, Dee S. An assessment of the duration of *Mycoplasma hyopneumoniae* infection in an experimentally infected population of pigs. *Vet Microbiol.* 2009;134(3–4):261–266.

6. Yeske P. Cost of eradicating diseases according to method. *Proc AASV.* Omaha, Nebraska. 2010;15–18.

7. Yeske P. Economic impact of *mycoplasma hyopneumoniae* eliminations. Proc 23rd IPVS Mexico 2014: 336